DOCUMENT RESUME

ED 073 510 CS 500 178

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TITLE Toward a Unified Communication Theory.
PUB DATE Nov 72
NOTE 24p.; Paper presented at the Annual Meeting of the Western Speech Communication Assn. (Honolulu, November 1972)

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS *Behavioral Science Research; *Behavior Theories; Conceptual Schemes; Fundamental Concepts; *Information Theory; *Language Universals; Linguistic Theory; *Symbolic Language; Theories

ABSTRACT

After discussing the nature of theory itself, the author explains her concept of the Unified Communication Theory, which rests on the assumption that there exists in all living structures a potential communication factor which is delimited by species and ontogeny. An organism develops "symbol fixation" at the level where its perceptual abilities exceed its immediate or local needs. Throughout this process "symbol manipulation" occurs, but it is most highly developed among higher primates. Symbol manipulation occurs when the organism reaches a level of concern beyond simple life functions and when perceptions on internal feelings can be externalized. "Symbol stagnation" occurs at the most rudimentary level of perception, impairing the fixation process and ultimately distorting communication. The author closes with suggestions for implementation of current data and for "pioneer" areas of further research. (Author/RN)

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Toward a Unified Communication Theory

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Gary Cronkhite once noted that an important focus for communications researchers is to discover why humans believe some of the "assertions which they clearly comprehend" and dismiss others.[1] While I quite agreed with him regarding the importance of the belief concern, I questioned his assumption that "they clearly comprehend." If one could clearly comprehend he would be blinded by the truth or non-truth in any situation, to literalize Thoreau.

After reflecting on an approach to Cronkhite's question, it began to seem to me that many of our current notions about attitudes, language, other behavior obscure not only this belief situation, but, also, many other communication phenomena. Further, what seems most to be needed to supply answers and direction is not more or different descriptive data, not isolated empiric findings, but, rather, theories. Certainly many others have noted that there exists a dearth of theory to explain the myriad and diverse manifestations of communication. But few have attempted to draw together the myriad and diverse sources from which we can expect unified explanation. Our constructs must draw on the biological, physical and social sciences. To provide suggestions for one such unified theory is the primary purpose of this paper.

Before such suggestions are attempted, however, it seems necessary to deal at some length with the nature of theory itself. This, because of the disparities which often exist regarding theory construction among social scientists and between the natural and social scientists.

ON THEORY

Prerequisite to any theoretical advancement in communication is the discarding of a few basic prejudices which are stifling our thinking. The current trends run mainly toward experimentation, greater empirical quantification, and generalizations therefrom. But we must give up the notion that we will be able to construct theories by generalizing and/or abstracting from our experiments and observations.

Indeed, our notions about the nature of experimentation per se are often too narrow. For example, many social scientists would scoff at the notion of "theoretic" experimentation. But such is essential to the advancement of knowledge. Witness, in 1938 Einstein conceptualized an ideal experiment (regarding the diffraction of single electrons) which could not be carried out in reality, but which could only be imagined. In 1949 a Soviet physicist performed such an experiment.[2] Such experiments of Einstein's, as well as his theories, continue to receive verification to this day.

What is theory?

In his Herbert Spencer lecture delivered in London in 1933, Einstein noted in commenting on eighteenth and nineteenth century natural philosophers: '. . .most of them (were) possessed with the idea that the fundamental concepts and postulates of physics were not in the logical sense free inventions of the human mind, but could be deduced from experience by 'abstraction'--that is to say by logical means. A clear recognition of the erroneousness of this notion really only came with the general theory of relativity, . . . the fictitious character of the fundamental principles is perfectly

evident from the fact that we can point to two essentially different principles, both of which correspond with experience to a large extent. . . ."[3] Obviously, the essence of this line of reasoning is that theory is <u>not</u> something logically abstracted from experience. Anyone inclined to grant an encompassing liberality to the notion of experience perhaps will not find this distinction crucial, yet such distinction is of great importance to the advancement of any science.

Over and over Einstein stressed the idea that empirical data do not imply the theoretical; that the theoretical contributes something of its own to the concept of nature and reality. But almost simultaneously he would make observations such as: ". . .even if it should appear that the universe of ideas cannot be deduced from experience by logical means, but is, in a sense, a creation of the human mind, without which no science is possible, nevertheless this universe of ideas is just as little independent of the nature of our experience as clothes are of the form of the human body."[4]

When perhaps pressed further for some connection between the theoretical and the empirical, he might answer: "Science is the attempt to make the chaotic diversity of our sense experience correspond to a logically uniform system of thought. In this system single experiences must be correlated with the theoretic structure in such a way that the resulting coordination is unique and convincing."[5] The precariousness of such correlation has been well explicated by Lincoln Barnett and warrants reproduction:

> More than twenty-three hundred years ago Plato declared, 'The true lover of knowledge is always striving after <u>being</u>. . . . He will not rest at those multitudinous phenomena whose existence is appearance

only.'

But the irony of man's quest for reality is that as nature is stripped of its disguises, as order emerges from chaos and unity from diversity, as concepts merge and fundamental laws assume increasingly simpler form, the evolving picture becomes ever more remote from experience--far stranger indeed and less recognizable than the bone structure behind a familiar face. For where the geometry of a skull predestines the outlines of the tissue it supports, there is no likeness between the image of a tree transcribed by our senses and that propounded by wave mechanics, or between a glimpse of the starry sky on a summer night and the four-dimensional continuum that has replaced our perceptual Euclidean space.

In trying to distinguish appearance from reality and lay bare the fundamental structure of the universe, science has had to transcend the 'rabble of the senses.' But its highest edifices, Einstein has pointed out, have been 'purchased at the price of the emptiness of content.' A theoretical concept is emptied of content to the very degree that it is divorced from sensory experience. For the only world man can truly know is the world created for him by his senses. If he expunges all the impressions which they translate and memory stores, nothing is left. That is what the philosopher Hegel meant by his cryptic remark: 'Pure Being and Nothing are the same.' A state of existence devoid of associations has no meaning. So paradoxically what the scientist and the philosopher call the world of appearance--the world of light and color, of blue skies and green leaves, of sighing wind and murmuring water, the world designed by physiology of human sense organs--is the world in which finite man is incarcerated by his essential nature. And what the scientist and the philosopher call the world of reality--the colorless, soundless, impalpable cosmos which lies like an iceberg beneath the plane of man's perceptions--is a skeleton structure of symbols.

And the symbols change. While physicists of the last century knew, for example, that the crimson of a rose was a subjective, aesthetic sensation, they believed that 'in reality' the quality they termed crimson was a group of oscillations of the luminiferous ether. Today it is conventional to identify crimson in terms of wave length. But it is equally proper to think of it as the value of the energy contents of photons. Such considerations led a famous physicist to remark cynically that on Mondays, Wednesdays, and Fridays one uses the quantum theory, and on Tuesdays, Thursdays, and Saturdays the wave theory. In either case the concepts employed are abstract constructions of theory. And upon examination such concepts as gravitation, electromagnetism, energy, current, momentum, the atom, the neutron, all turn out to be theoretical substructures, inventions, metaphors which man's intellect has contrived to help him picture the true, the objective reality he apprehends beneath the surface of things. So

> in place of the deceitful and chaotic representations of the senses science has substituted varying systems of symbolic representation. While these systems are distinguished by constantly increasing mathematical accuracy, it would be difficult today to find any scientist who imagines himself, because of his ability to discern previous errors, in a position to enunciate final truths. On the contrary, modern theorists are aware, as Newton was, that they stand on the shoulders of giants and that their particular perspective may appear as distorted to posterity as that of their predecessors seemed to them.[6]

This discussion of Barnett's serves to introduce further ramifications of theory to which we shall turn shortly--specifically, theoretical substructures and symbolic representation. However, one final general note is vital; that being to point out Einstein's own insistence on housing the physical and social concerns under one system. He touched on this in the very first paragraph of The Meaning of Relativity, saying: "The object of all science, whether natural science or psychology, is to co-ordinate our experiences and to bring them into a logical system."[7] And, as is generally known, he credited the social sciences with the far more difficult task.

Theoretical Substructures

It is elemental that social scientists conceive of mathematics as a theoretical substructure. All symbolic notation systems, mathematics included, have potential for either helping or hindering the expression of relationships. The connection between theoretic concepts and structural expressions has been succinctly explained in D. W. Theobald's definition of theory: "A theory can be regarded as a linguistic structure built around a logical skeleton or 'formal calculus', which implicitly defines and relates the basic concepts usually, though not always, in a mathematical way."[8]

I do not believe that enough social scientists are aware that there is nothing permanent and/or finite about numeric or non-numeric mathematics, inherently. The questionable use to which statistics and, more recently, systems models, often have been put in the social sciences would bear support of this. Perhaps some abuse has been merely prompted by the notion that mathematics can provide the most precise description, hence some explorations should be made. More often it seems mathematical notations have been used purely for their own sake regardless of whether they are appropriate to the concepts to which they were applied.

Symbolic notation systems, whether they take the form of billiard-ball atom models, artificial languages, or indeed natural languages, are all metaphoric bridges. Of course, the scientist wants his expression to be as succinct as possible, so he turns to mathematical bridges. Such a desire for compendiousness can readily be understood by anyone who has ever tried to add a column of Roman numerals. But appropriateness cannot be sacrificed for succinctness.

How then does one approach this business of science and finally find the appropriate notation system to express what he has found, assuming he finds anything? To hint at an answer, we turn again to Einstein. Defining the process of his work, he would begin by commenting that the natural sciences and particularly the most fundamental one, physics, deals with impersonal sense perceptions.

It might be well to pause to point out that the social sciences deal not only with the impersonal perceptions but also with the infinitude of those perceptions common only to one or to a few

individuals. The immense complexity of the task of social science compared to that of physical science should be readily evident considering but even this one factor.

To return to Einstein's approach to science: through the course of his discussions of the development of the general theory of relativity, he variously noted similar concepts of those before him. Here and there one reads of the great amount of time he spent thinking and reworking from the instant the insight struck him until he accomplished a theory. Then there was further thinking and reworking before he ventured the theory into the experimental lab, before he had the proper vehicle to express the relationship which he conceptualized. One important substructure so long in the coming was the proper mathematical notation, or as Einstein credited: "The mathematical knowledge that has made it possible to establish the general theory of relativity we owe to the geometrical investigations of Gauss and Riemann."[9]

Summary

Based on this discussion of theory and substructures, it may be said that three major aspects constitute theory formation:

1) Theory is not implied by nor abstracted logically from concrete perceptions; it contributes of itself to reality.

2) Theoretical substructures manifest themselves as symbolic bridges, metaphors, to relate aspects of the theory to empirical data.

3) These metaphors must be unique and convincing, logical and consistent.

Perhaps one final observation relative to the aim of theory should be made. Again, we borrow Einstein's expression: "it is

the grand object of all theory to make these irreducible elements as simple and as few in number as possible, without having to renounce the adequate representation of any empirical content whatsoever."[10]

UNIFIED COMMUNICATION THEORY

Hopefully, a notion ultimately will evolve which would narrow the gap which now exists between the social and natural sciences. Ideally, as sound a notion as quantum mechanics, which unified the physical sciences, or molecular biology, which supplied the common foundation for all natural sciences, life and physical. We might well expect such a unifying notion to emerge from the field of psychobiology. It is certainly not unreasonable to assume that such a notion be grounded in communication, a process already being dealt with variously by both natural and social scientists. What follows here are rudimentary suggestions for a construct which might bind together and explain the many diverse communication phenomena.

Communication Factor

The Unified Communication Theory rests on the assumption that there exists in all living structures a potential communication factor which is delimited both by species and ontogeny.

Communication in its most fundamental sense may be thought of as transplanted imitation. A living structure which has no sensory perception and no accumulated culture has little to communicate except itself. At this level we have ideal communication; save malfunction or interference of foreign substances, there will

occur a transplanted imitation, that is, a complete and sound communication.

Perhaps the most basic communication is initiated by deoxyribonucleic acid (DNA) structures. DNA, popularly called the blueprint material of all living organisms, is comprised of a double chain of nucleotides. Nucleotides are identical in every living creature; what determines a man or a rat is the order of these nucleotides. When DNA chains divide in cell growth they call to them loose nucleotides in the cell which take on an order identical to the DNA structure, thereby forming two new double chains. This building process is predicated on rudimentary communication. The nucleotides have received a full communication and have themselves achieved the meaning through an inalienable syntax.

It is at this very level, of course, that the full communication potential for the entire organism is determined. Whatever a higher organism can take in and assimilate perceptually within his range becomes part of him. So, in fact, even the highest organism has only itself to communicate.

Least one assume that the communication process is being relegated to a chemical hinterland, it should be explained that this process on all levels is a chemical and physical interaction, as are other life functions. The following analogy should partially elucidate this interaction. It is well known that blood-clotting time varies from human to human and that unless a certain chemical reaction takes place, the individual's blood will not clot at all. There comes a point, though, at which the chemical properties cease

to dictate the healing of the wound and physical properties take over. Physical conditions and properties not being conducive to healing would, of course, have ultimate dictate over even an optimum chemical process begun. Likewise, various types of chemical reactions predispose the physically-determined process and, of course, in the absence of any chemically-bound action, we should never get around to the physically-bound ones.

Returning to the communication processes of organisms, it should be noted that inherent in the factor is both "sending" and "receiving" notions. That is, the DNA communication was complete because everything sent was received. Sending everything and receiving everything each to each is implied in the communication factor. When communication is not complete, there is generally one of two explanations we can look to. The first is that the life structures involved in the attempted communication are too unlike. That is, we would not expect an amoeba to understand a cat's meow for cream. Assuming the first is not the case, the second is: that there has been interference. In simple organisms this results primarily, as was indicated for DNA structures themselves, from malfunction or intervention of foreign substances. While both of these hinder communication among higher organisms, there is an aspect of the latter which is the more frequent and fundamental source of interference. This source appears to be internal and inherent to the methods by which most higher organisms communicate at this point in time. To understand how this functions, it is necessary to examine another facet.

Symbol Fixation

The second major tenet of the Unified Communication Theory

supposes a disposition for what we will call symbol fixation. Symbol fixation is a process. The word symbol is used in its most generic sense and fixation in a sense similar to its denotation for a chemical process rather than the denotation of psychological stasis.

Symbol fixation occurs at the level of development where an organism's perceptual abilities exceed his immediate and/or local needs. It is on this same plateau that learning can impinge on sheer instinct.

Any thing and any aspect of any thing in an organism's enviornment is a potential symbol, of course. But lower organisms perceive so little of their enviornment that the cells within their own bodies have little more to communicate among themselves, let alone to another organism, than their own DNA structures do. Such a creature might perceive nothing at all except two "shapes": smaller than itself and larger than itself. Each would have an inalienable meaning; the former, we would translate, no doubt, as food; the latter, danger. There is no need of the symbol fixation process at such a level.

Symbol fixation may be thought of as occuring at the point of consciousness. That is, the point at which an organism has more to be aware of than its own physical processes and hence, somewhat paradoxically, becomes aware of its own physical processes, in fact.

By way of more roundly explaining the occurance of the process, an analogy with Susanne Langer's notion of thought is suggested. That notion is that there reaches a point where internalized excess of feeling manifests itself in thought.[11] It is important to note, however, that the symbol fixation process presumes no

sophistication of thought. Konrad Lorenz has related many charming stories which demonstrate far more advanced thought among animals, including fish,[12] than is necessary to illustrate the correlate plane wherein symbol fixation exists.

Symbol Manipulation

A third aspect of the Unified Communication Theory deals with symbol manipulation. This occurs to some extent throughout the symbol fixation process, but is most highly developed among higher primates, man in particular. Symbol manipulation also is bound to the very bases, described previously, in all living structures.

It is crucial to understand the sort of manipulation implied here. It will be recalled that the manipulation preformed in the basic life structures rested on an inalienable syntax for meaning. The lower organism's *food* and *danger* symbols likewise were not truly manipulative, being inherently stagnant. Whereas, here, an organism must be capable of *learning* and hence *assigning* his own meaning to perceptions, capable of creating symbols. Having reached a developmental state which frees him for things other than sheer life functions, the organism has leisure to toy with his perceptions.

Symbol manipulation may be thought of as fitting into the fixation continuum in this manner: if we ascribe the rudiments of the symbol fixation process to that point where internalized excess of feeling manifests itself in thought, then symbol manipulation occurs when that thought is externalized. When that externalization is highly codified we commonly call it *language*.

Many deceptions occur in this area; it is here man most

usually wants to separate himself from the other animals and in so doing overlooks many clues to basic understanding of his own communication (or lack of communication. . .) Numerous instances exist even among lower animals of externalized and codified processes. What many men take for instinct (in the traditional sense) is often actually learned, culturally transmitted among animals, sometimes by good communicators, other times not.

The more highly codified the process, the more likely incomplete communication is to occur. Even great mastery of the code is no assurance against this failure; the notion that it is is a misconception predicated by two inversions concerning primarily human languages. These languages, natural and "artificial," verbal and non-verbal, are all predicated on one basic potential--algorithmic functioning, exhibited to some extent even in the DNA structure's communication. However, men often choose to invert the situation, saying that these codified externals, these syntactic patterns which are learned, are actually something internal, a priori. It is only the function which is inherent. Combined with perceptions and solidified by external reinforcement--socialization--the function is obscured.

Symbol Stagnation

The second and more basic inversion actually encompasses the first. Syntactic patterns can themselves be symbols just as can any other thing or any aspect of any thing whether perceived from sources external or internal to the organism. All of these things are liable to symbol stagnation. Stagnation usually occurs at the perceptual level most rudimentary and/or most prevalent among organisms of like kind. Thereafter back-formation occurs

and the entire symbol fixation process is impaired, ultimately to prevent or distort communication. Whether an individual man has any more control over this than any other animal is questionable.

The organism most facile at breaking codes, hence the truly more facile at symbol manipulation, will exhibit less symbol stagnation and thereby achieve more freedom in his symbol fixation process. It is not unlikely that man will some day devise methods of deleting externalized and codified systems and thereby achieve more complete communication. Actually, some other animals (especially sea mammals) seem to have struck a somewhat better balance already.

The deletion of external symbols may appear to be contradictory to our notions of communication. But that is only because currently we are inclined to define communication by its external and superficial aspects. Marshall McLuhan has made great strides away from such definitions. His descriptions of the current state of affairs reveal man to have reached perhaps the ultimate in externalized communication: the extended nervous system vis-a-vis the electronic media.[12] As McLuhan observes, the new electronic technology does not need words.[13] Yet we are still bound to codes, perhaps somewhat more universal and less inherently stagnating, but, nevertheless, restrictive.

So if there were no symbol manipulation nor stagnation, no externalization, how would we indeed communicate? As already pointed out such systems do exist in whole in living structures and in part in some organisms. What we must do is regard manipulation and stagnation not as means of communication, but as impediments, in the forms which now exist at any rate, to

communication. If we were to communicate on the plane wherein the fixation process itself exists, one could have a "stop motion" at any instant and the entirity of an individual could be communicated to another in a fashion similar to the most basic DNA communication. There could be a perfect imitation imaging forward.

Indeed, if it were not for symbol manipulation and symbol stagnation, with back-formation therefrom, symbol fixation levels might rarely be reached. That is, pure symbol fixation is rarely realized in higher organisms due to preempting by symbol manipulation and subsequent stagnation. Animals in game situations can be taught to react to one symbol in one way or a variety of ways. In a natural situation one animal may in fact react to another animal in a variety of ways or it may react in only one if it has been so taught. A lion raised by a pride on the plains may regard an antelope as only one simple symbol: food. A baby lion raised in captivity might regard an antelope as mother, friend, playmate, even enemy; other possibilities exist and combinations of possibilities.

In man we often regard the person who sees many aspects or new aspects of a thing beyond its common symbol or first-learned symbol as an artist or genius. Yet in all instances a stagnation must occur in order for such a person to communicate something by our external systems. Hopefully it will be temporary and transitory, so he may go on to see yet other aspects and discover new possibilities or truths. Instances of such progress are rare just as instances of a domesticated lion's being trained to regard his one-time friends as food in order that he could survive in a wild enviornment are rare. Though, certainly, learning processes could be undertaken whereby neither instance would be a rarity.

Perhaps the most basic misconception about communication is that we do indeed communicate. At any rate, we certainly never deal in whole communication in man's every day world. When a person inquires how are you we do not communicate our entirity to him; rarely even a portion; usually none at all since at this level we can deal in symbol manipulation wherein it is not necessary to actually communicate at all. This occurence is not limited to such civil pleasantries, but pervades our deepest philosophic and scientific exchanges.

To allay another misconception: an entire reply would not be more complex than a DNA communication, only more diverse. That is, the more sources other than itself and the more aspects of those sources perceived are what lend to diversity. Also, as the organism takes on more functions within itself there are more sources and aspects of those sources to lend to diversity. The more organisms involved, of course, the more interaction of perceptions. But these activities are predicated on the same physical and chemical properties as those at cellular level.

The symbol fixation process is electro-molecular. It consists of a flux of internal and external perceptions received, intermingled, separated or rejected according to the chemical and physical properties inherent to the organism; this flux is also a function of the number of organisms in a given communication situation. What underlies the potential of this situation or any other are of course the DNA structures themselves. How all communication actually occurs may be thought of as patterned by DNA structures and dynamised by an irreducible quantum. These quanta are the stuff neither of energy nor matter. They may be described as pure pattern or order, rhythm. Such rhythms are

manifest from the most basic inherent internal aspect of the communication process to the most elaborate external code. So what we are talking about when we speak of communication is a complex of rhythms which might be placed along a continuum: at the DNA level they achieve direct meaning; moving away from that level, the meaning becomes more indirect, being first explicit, then implicit, and finally codified.

At this point, it should be pointed out that the same sense is not meant for these rhythms as the binary or trinary codes of the information theorists; these patterns are not synonymous with those described by transformational theorists. However, these rhythmic quanta do account for both of the external phenomena just mentioned. Contrary to Information Theory, the Unified Communication Theory does not posit codes and channels as distinct from meaning. As meaning becomes more specific, the mode of conveying it becomes more codified. As meaning becomes more externalized, the variety of channels increases.

Symbol fixation is directional in the sense that each aspect seeks its own level as it were. Any symbol impinging on an organism's consciousness must manifest itself to the ultimate capability of the organism (physically and chemically delimited by species and ontogeny). We may say the organism <u>believes</u> that symbol at this point. What propositions he <u>believes about</u> that symbol belong in the realm of symbol manipulation. But he must believe that symbol in order to believe anything about it.

A <u>belief</u> in the fixation process excludes no other beliefs, each being merely a perceived and assimilated aspect. But <u>beliefs about</u>, having occured through stagnation and back-formation, are readily open to contradiction. Many will be rejected by the organ-

ism. Let us take two examples to elucidate. The first involves a rather complex event. An automobile accident takes the lives of both parents of a young man. Suppose the chemical reactions such news produce in the boy prevent his believing the incident. He may experience temporary shock or a more permanent state of nonacceptance; whatever, so long as he does not believe the event, it is useless to attempt discussion with him about the event. Yet some would persist in giving him rationalizations and/ or encouragement. This example is but an extreme of the events which pervade our lives. Daily we try to discuss beliefs about our own perceptions with others, completely heedless of whether we start from enough overlapping experience to allow even remotely successful communication.

The second example, more simple, deals with color perception. Suppose I am asked to distinguish between two blues which we shall call royal and navy. Whether I believe there is an actual difference will depend both on my innate color perception talent (range) and on my learned color discrimination. If I do not believe there is a distinct royal and a distinct navy, I certainly cannot believe such statements about them as: "Beige goes better with navy than with royal." "Royal is a better complement for red than navy is."

The point really is that discussing any norm about perceptions and their acceptance is a very tenuous matter. Certainly philosophers and scientists have made the point repeatedly throughout history. Yet, we somehow often seem to lose sight of this fact when discussing the nature of communication.

It would appear that once a <u>belief about</u> has been established it is very easy to reinforce it but difficult to change it due to

the nature of the chemical and physical properties involved. Increasingly, controlled research indicates that the chemical and physical properties which determine all developmental aspects of the adult animal are established in early childhood; these ontogenetic potentials being of course predicated on the total of received genetic factors including species-specific.

Perhaps some day our knowledge of the electro-molecular will advance to a point therefrom methods will be developed so that more complete communication may occur among humans. At that stage we could communicate what we <u>believe</u>, not merely what we <u>believe about</u>. More important, though, would be that less stagnation and back-formation would occur; subsequently, gone would be "prejudice" and ignorance up to the point of each organism's fixation limit. That is, each organism could freely develop to the limit of his fixation range since there would no longer be back-formation to preempt such growth. Whether such communication means would serve to better or worsen the human situation remains to be seen.

<u>Recommendations</u>

Further work related to this Unified Communication Theory should deal with two main areas: 1) Organization and incorporation of currently established empirical date, and 2) investigation in pioneer fields, as will be discussed shortly. Regarding this first area, some incidental examples have already been mentioned. For the sake of more overt illustration, let us consider some descriptive terms employed in rumor studies. These particular studies are cited here because their propositions can be readily integrated with the theory, and because their ramifications for both explana-

tion and prediction in various communication situations seem not to have been generally recognized.

"Many of the so-called rumor studies do not use rumors as their stimulus message (the slides of Allport and Postman, the stories of Bartlett and Paul, the prose passages of Higham and Johnson). Comparative data from studies using messages containing accurate or inaccurate information fail to show any striking differences in outcome that are due to the content of the message. And finally, much of what passes in ordinary political, religious, economic, social, or even psychological discussion has no more 'secure standards of evidence' than rumor material is supposed to possess. The 'principle of integrative explanation' and 'effort after meaning' appear to accomodate with equal validity messages transmitted serially about a variety of events and in a number of social settings."[14]

"The major changes in the message were described as 'leveling' (in which the message grew shorter and simpler through omission of detail), 'sharpening' (in which remaining details were magnified), and 'assimilation' (in which the material was transformed to fit the interests, prejudices, expectations, and language habits of the communicant.) These transformations, as Bartlett suggested earlier, were not random but were used to produce a structured and meaningful stimulus field."[15]

It is suggested that sharpening, leveling and assimilation are all aspects of symbol fixation and are functions of species, ontogeny and situation. It is also suggested that from these three factors further deductions could be made wherefrom prediction laws could be derived relative to a variety of communication situations.

Regarding the second area, two pioneer fields which appear

most fruitful for study are 1) what we call human intuition, of the highest sort, and 2) the communications between humans and other higher animals.

In the first instance it is commonly said that what we are dealing with is a situation in which someone needs fewer clues than ordinary to reach a valid observation. Doyle's Dr. Watson also said just this of Sherlock Holmes long before soc[illegible] scientists remarked the same process. Actually this observation seems as shortsighted on Watson's part, at least, as most of his others. What Holmes exhibits is extreme lack of symbol stagnation; he is open to every person and every situation almost as a blank receiver. (He frequently winds up with a great many clues!) Another level of this intuition business branches into an area, variously labeled but frequently called telepathy. And meager though the valid cases may be, there is no reason to assume studies in this area would be of no value. In fact, the area seems pregnant for electro-molecular discoveries.

The second area, human-other animal communication, seems perhaps even more promising due to the widespread occurence of successes. It should be the animals rather than the humans who receive the focus of attention; it is they who have largely been responsible for bridging the gap. Here again we hear the animals credited with being able to pick up the slightest clues from a person--voice intonations, slight body movements. But it might be more revealing to regard these clues from a polar angle. Rather than regarding them as a sort of dimishing external clue (since we ourselves rely so heavily on external systems, such a view is

understandable), might not they be regarded as surfacing internal clues, perhaps the margin of some electro-molecular phenomena? There are simply too many every day occurences (plus accumulating lab evidence) of human-other animal communication in which the animal demonstrates a message received without revealing any external medium, either on his part or the human's, to preclude our suspecting a promise of some electro-molecular principle at work.

FOOTNOTES

[1]Gary Cronkhite in an address at the University of Southern California, July, 1970.

[2]Albert Einstein and Leopold Infield, The Evolution of Physics (New York: Simon and Schuster, 1961), p. xii, p. 281.

[3]Paul Arthur Schilpp (ed.), Albert Einstein: Philosopher-Scientist (Evanston: The Library of Living Philosophers, Inc., 1949), p. 273.

[4]Ibid., p. 2.

[5]Ibid., p. 406.

[6]Lincoln Barnett, The Universe and Dr. Einstein (New York: New American Library, 1952), pp. 113-115.

[7]Albert Einstein, The Meaning of Relativity (5th ed.; Princeton: Princeton University Press, 1955).

[8]D. W. Theobald, The Concept of Energy (London: E. & F. N. Spon Ltd., 1966), p. 15.

[9]Einstein, op. cit.

[10]Schilpp, op. cit., p. 275.

[11]Susanne K. Langer, Philosophical Sketches (Baltimore: The Johns Hopkins Press, 1962).

[12]Konrad Lorenz, King Solomon's Ring (New York: Thomas Y. Crowell Co., 1952).

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